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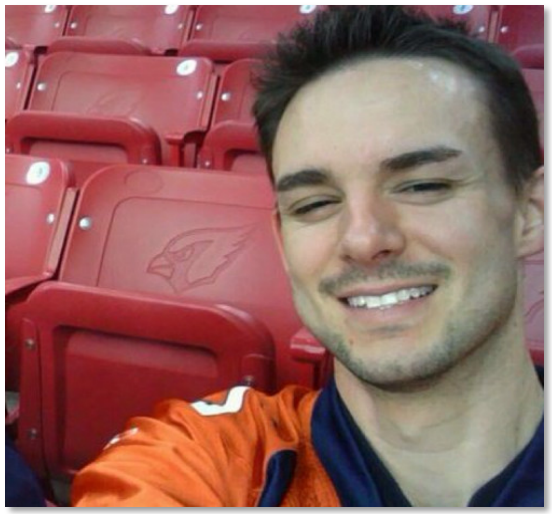


# FAST: Using Federal Fleet Data for Decision-Making

## New Ways of Using Vehicle-Level Data

Tim Raczek · Ron Stewart

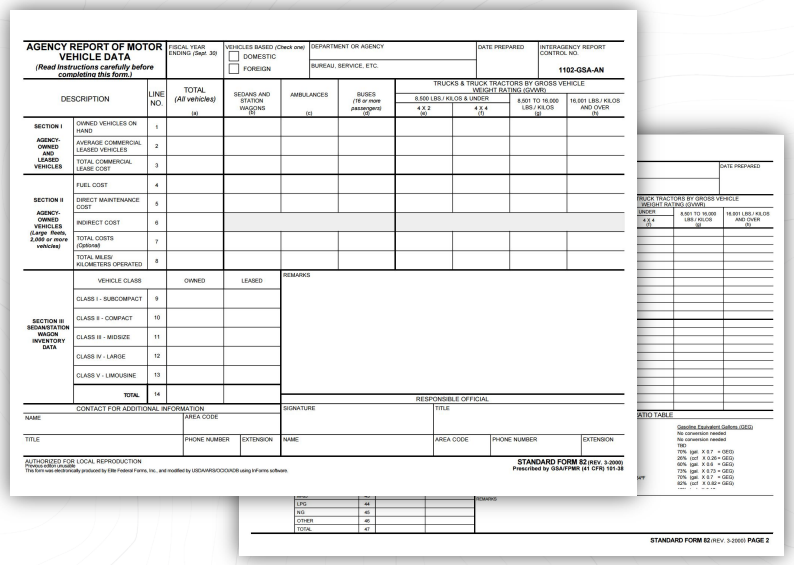
Idaho National Laboratory


# We'll cover…

- A bit of background on federal vehicle fleet data
  - What we have and how we got here
- What can we do with this data?
  - A quick look at the federal vehicle fleet
- Fleet decision-making
  - Three examples of how the data can be used

# Federal Fleet Data: The Early Years

- Earliest version of FAST
  - Based on GSA Standard Form 82
  - Location: foreign vs domestic
- FY 2003-2016 (ish)
  - Foreign vehicles
  - Domestic vehicles by state
- FY 2006-present
  - EPAct 2005 Section 701 waiver requests with lat+lon or street+city+state+ZIP



AGENCY REPORT OF MOTOR VEHICLE DATA

(Read Instructions carefully before completing this form.)

FISCAL YEAR ENDING (Sept. 30)

VEHICLES BASED (Check one): ☐ DOMESTIC ☐ FOREIGN

DEPARTMENT OR AGENCY

BUREAU, SERVICE, ETC.

DATE PREPARED

INTERAGENCY REPORT CONTROL NO.

1102-GSA-AN

| DESCRIPTION | LINE NO. | TOTAL (All vehicles) (a) | SEDANS AND STATION WAGONS (b) | AMBULANCES (c) | BUSES (16 or more passengers) (d) | TRUCKS & TRUCK TRACTORS BY GROSS VEHICLE WEIGHT RATING (GVWR): 8,500 LBS / KILOS & UNDER 4 X 2 (e) | 8,500 LBS / KILOS & UNDER 4 X 4 (f) | 8,501 TO 16,000 LBS / KILOS (g) | 16,001 LBS / KILOS AND OVER (h) |
|---|---|---|---|---|---|---|---|---|---|
| SECTION I AGENCY-OWNED AND LEASED VEHICLES — OWNED VEHICLES ON HAND | 1 | | | | | | | | |
| AVERAGE COMMERCIAL LEASED VEHICLES | 2 | | | | | | | | |
| TOTAL COMMERCIAL LEASE COST | 3 | | | | | | | | |
| SECTION II AGENCY-OWNED VEHICLES (Large fleets, 2,000 or more vehicles) — FUEL COST | 4 | | | | | | | | |
| DIRECT MAINTENANCE COST | 5 | | | | | | | | |
| INDIRECT COST | 6 | | | | | | | | |
| TOTAL COSTS (Optional) | 7 | | | | | | | | |
| TOTAL MILES/ KILOMETERS OPERATED | 8 | | | | | | | | |

| SECTION III SEDAN/STATION WAGON INVENTORY DATA — VEHICLE CLASS | | OWNED | LEASED |
|---|---|---|---|
| CLASS I - SUBCOMPACT | 9 | | |
| CLASS II - COMPACT | 10 | | |
| CLASS III - MIDSIZE | 11 | | |
| CLASS IV - LARGE | 12 | | |
| CLASS V - LIMOUSINE | 13 | | |
| TOTAL | 14 | | |

REMARKS

CONTACT FOR ADDITIONAL INFORMATION

NAME | AREA CODE | PHONE NUMBER | EXTENSION

TITLE

RESPONSIBLE OFFICIAL

SIGNATURE | TITLE | NAME | AREA CODE | PHONE NUMBER | EXTENSION

AUTHORIZED FOR LOCAL REPRODUCTION

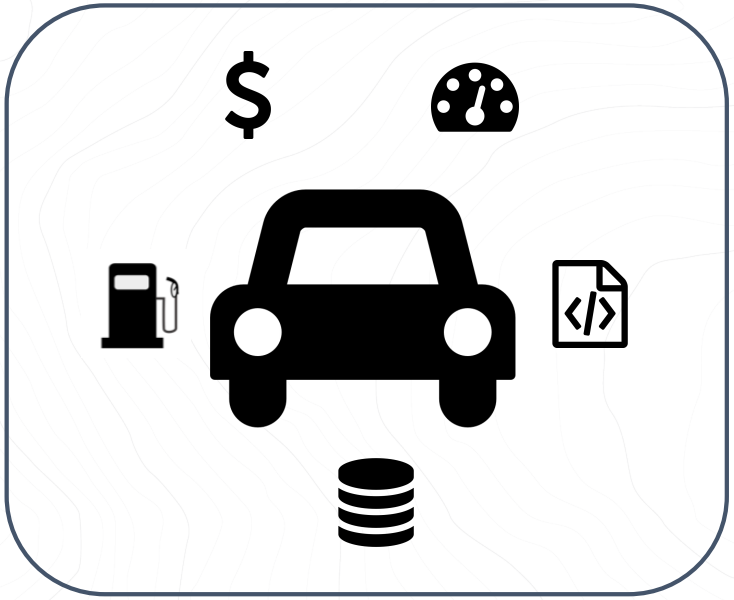
STANDARD FORM 82 (REV. 3-2000)

Prescribed by GSA/FPMR (41 CFR) 101-38

STANDARD FORM 82 (REV. 3-2000) PAGE 2

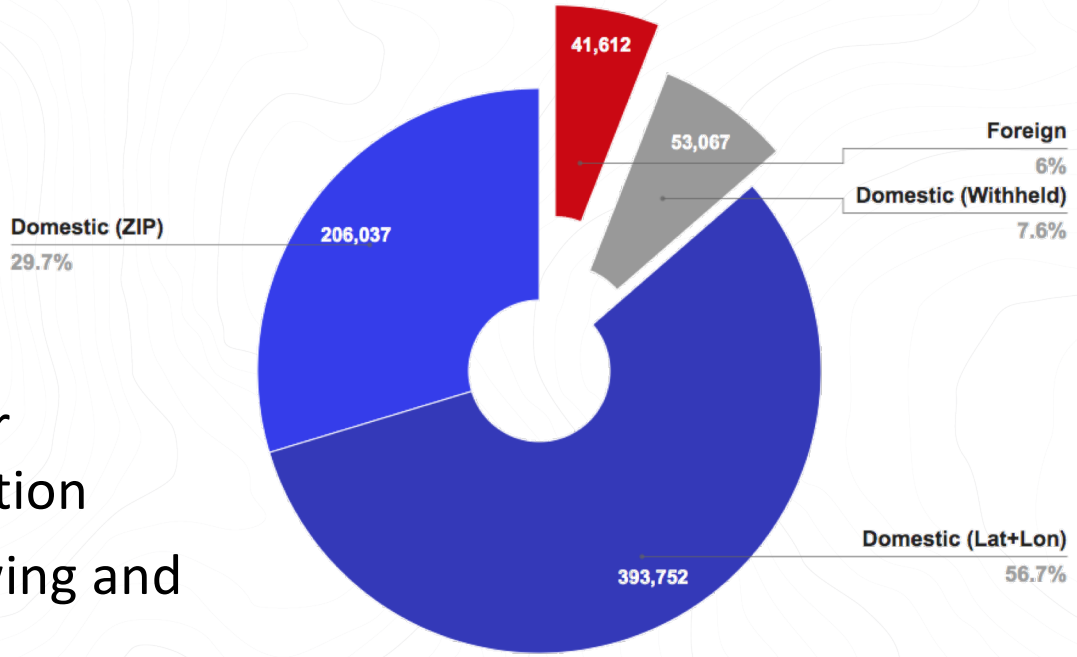
# Federal Fleet Data: Per-Vehicle Information

- FY 2018 (and future)
  - All federal agencies submit per-vehicle data
- Every vehicle reported with…
  - Vehicle attributes
  - Ownership, acquisition, disposal data
  - Annual cost data and miles travelled
  - Fuel consumption data



# Per-Vehicle Information: Location

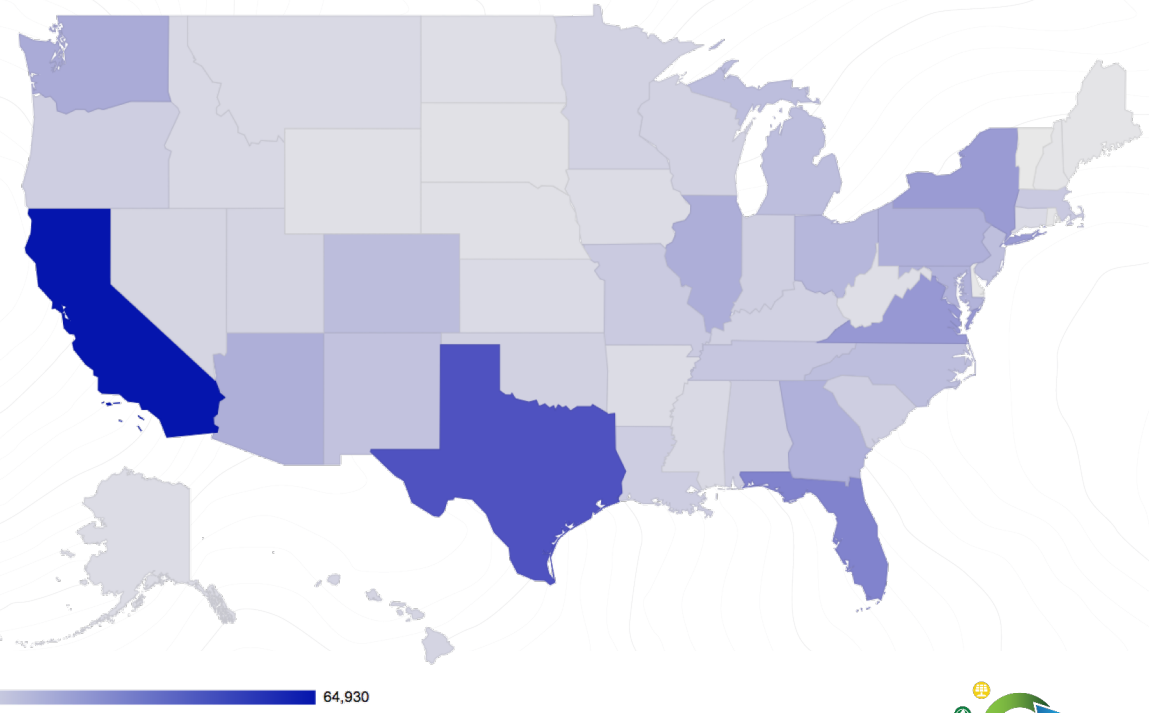
- All vehicles have location
  - Foreign
  - Domestic: Withheld
  - Domestic: Lat+Lon
  - Domestic: ZIP
- We post-process dataset for consistent location information
- Opens up new ways of viewing and analyzing fleet data



# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet Vehicle Inventory**

| State | Inventory |
|---|---|
| California | 64,930 |
| Texas | 43,605 |
| Florida | 29,423 |
| Virginia | 23,269 |
| New York | 22,464 |

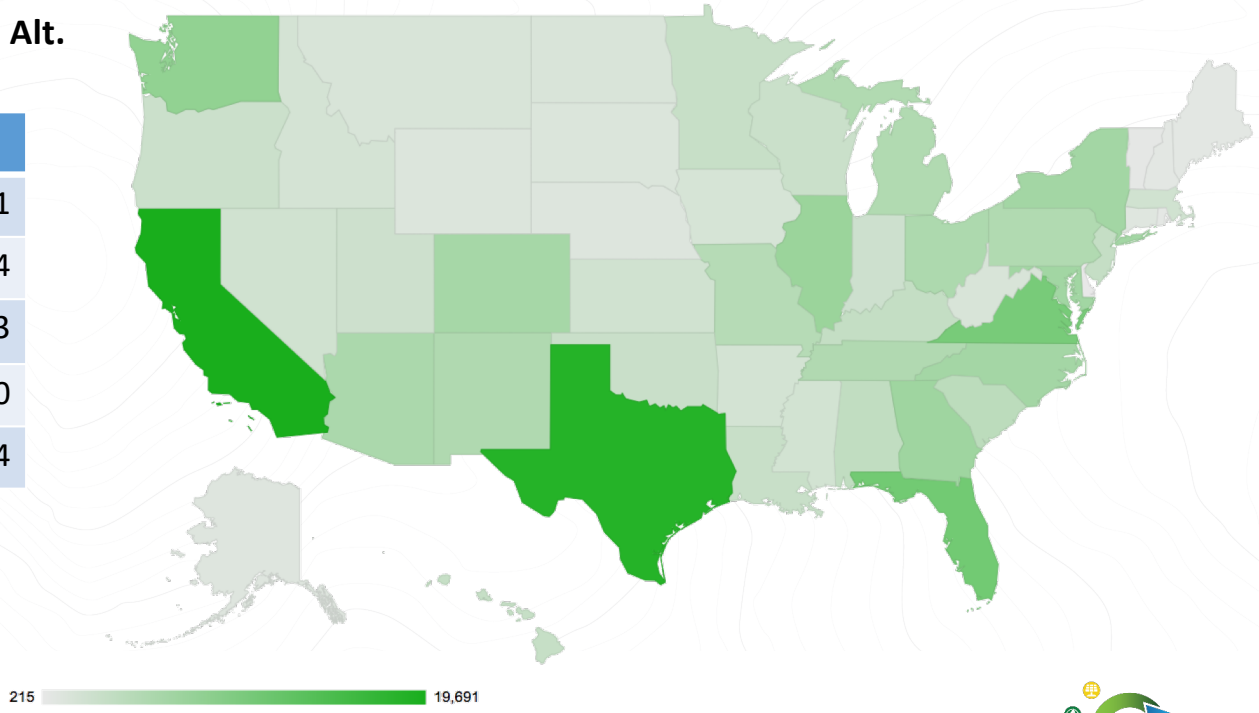



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet Alt. Fuel Vehicle (AFV) Inventory**

| State | AFV Inventory |
|---|---|
| California | 19,691 |
| Texas | 17,794 |
| Florida | 10,363 |
| Virginia | 9,900 |
| Washington | 7,584 |

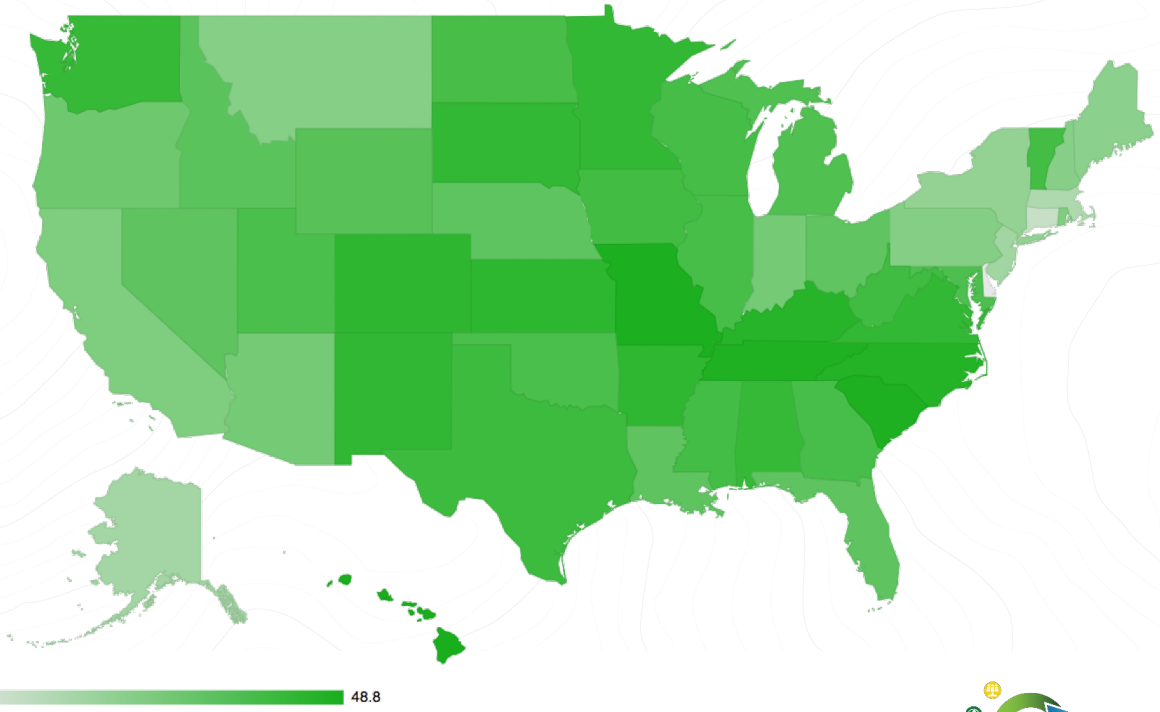



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet % Alt. Fuel Vehicle (AFV) Inventory**

| State | % AFV Inventory |
|---|---|
| Hawaii | 48.8 % |
| Missouri | 47.8 % |
| South Carolina | 47.3 % |
| Dist. of Columbia | 47.1 % |
| Tennessee | 46.7 % |

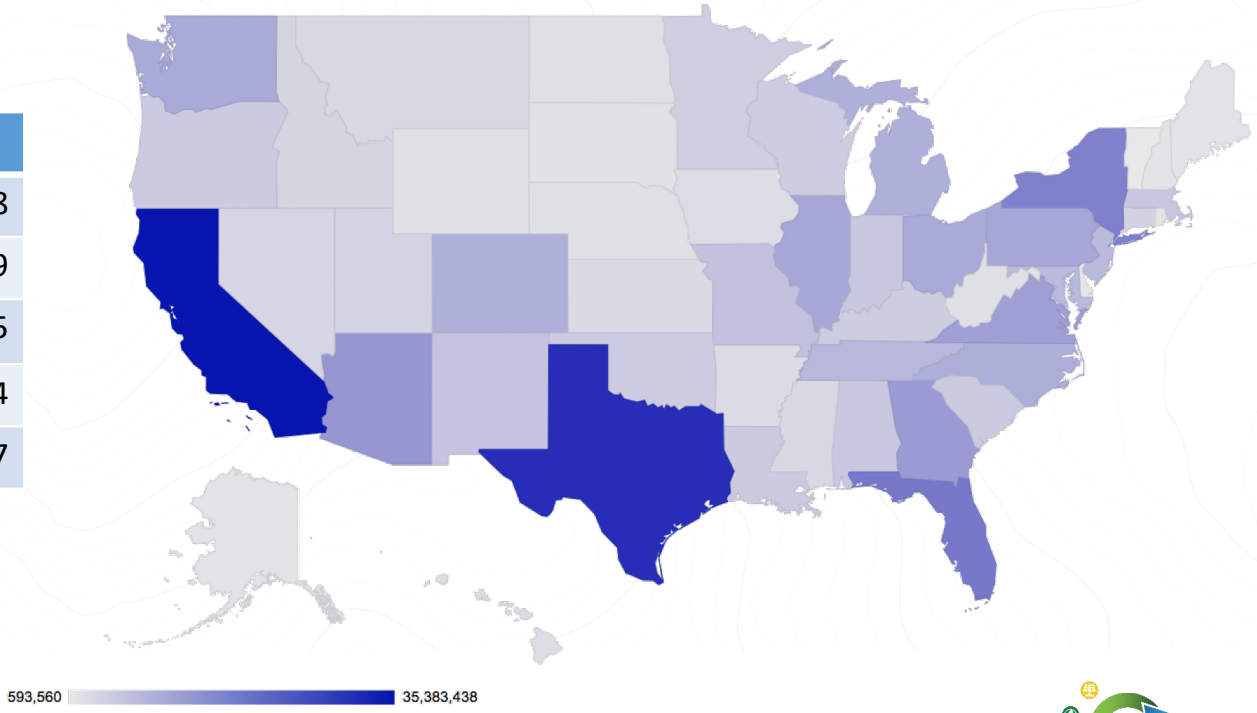



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet Fuel Consumption**

| State | Volume (GGE's) |
|---|---|
| California | 35,383,438 |
| Texas | 29,766,679 |
| Florida | 17,673,025 |
| New York | 16,318,964 |
| Arizona | 13,035,237 |

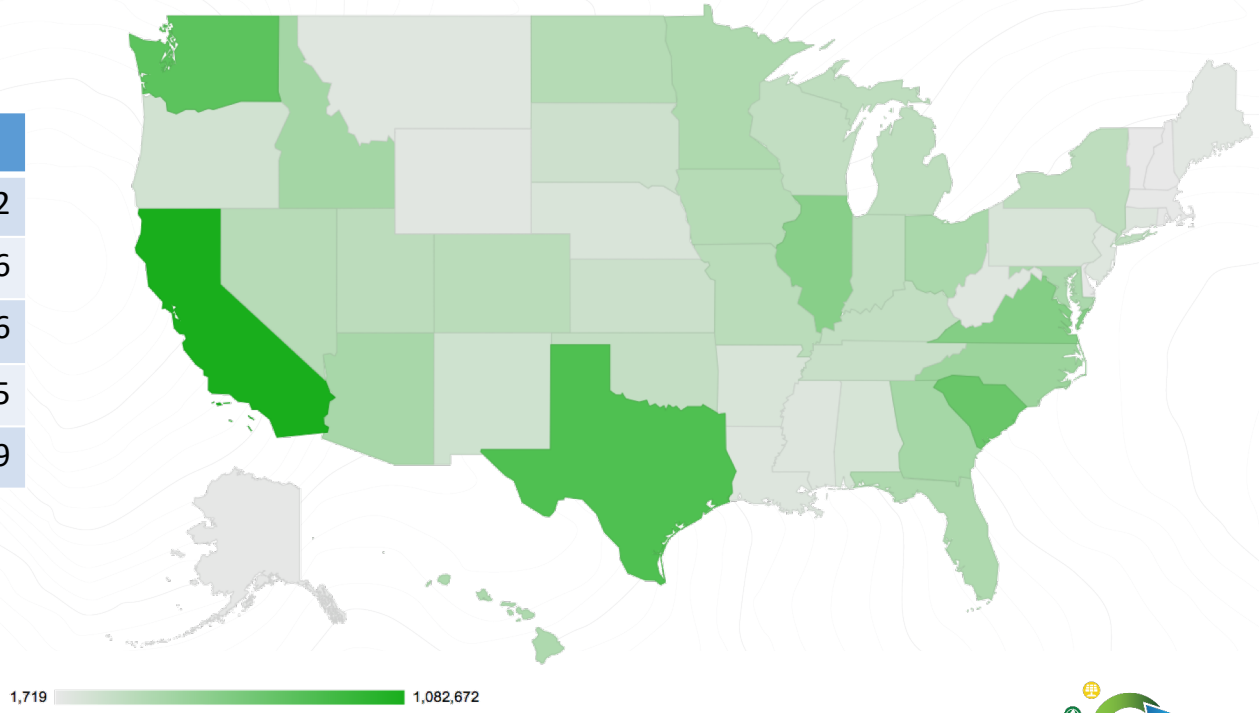



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet Alt. Fuel Consumption**

| State | Volume (GGE's) |
|---|---|
| California | 1,082,672 |
| Texas | 736,376 |
| Washington | 672,536 |
| South Carolina | 612,465 |
| Virginia | 475,389 |

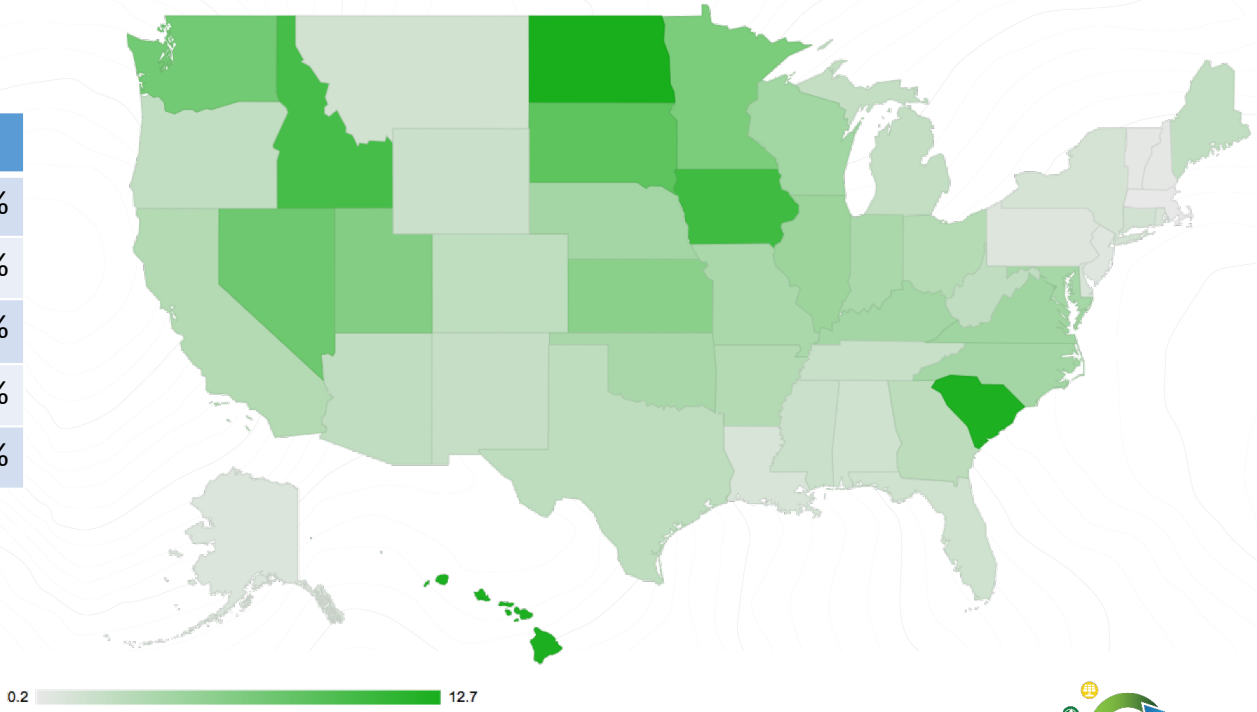



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Domestic Federal Fleet**
**% Alt. Fuel Consumption**

| State | % Alt Fuel |
|---|---|
| North Dakota | 12.7 % |
| Hawaii | 12.3 % |
| South Carolina | 12.2 % |
| Iowa | 9.7 % |
| Idaho | 9.3 % |

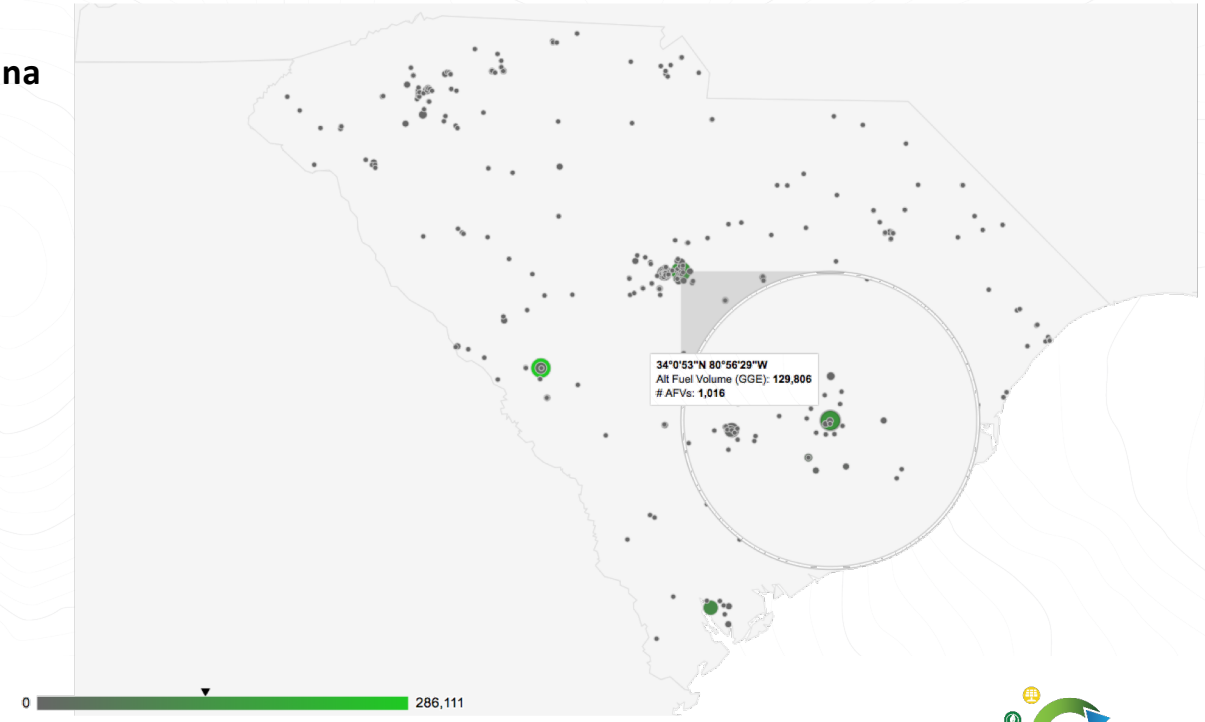



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Federal Fleet Data: Let's Take a Look

**FY 2018 Federal Vehicle Alt Fuel Consumption Volume: South Carolina**

- AFV's: widely distributed
- Alt fuel consumption: highly localized

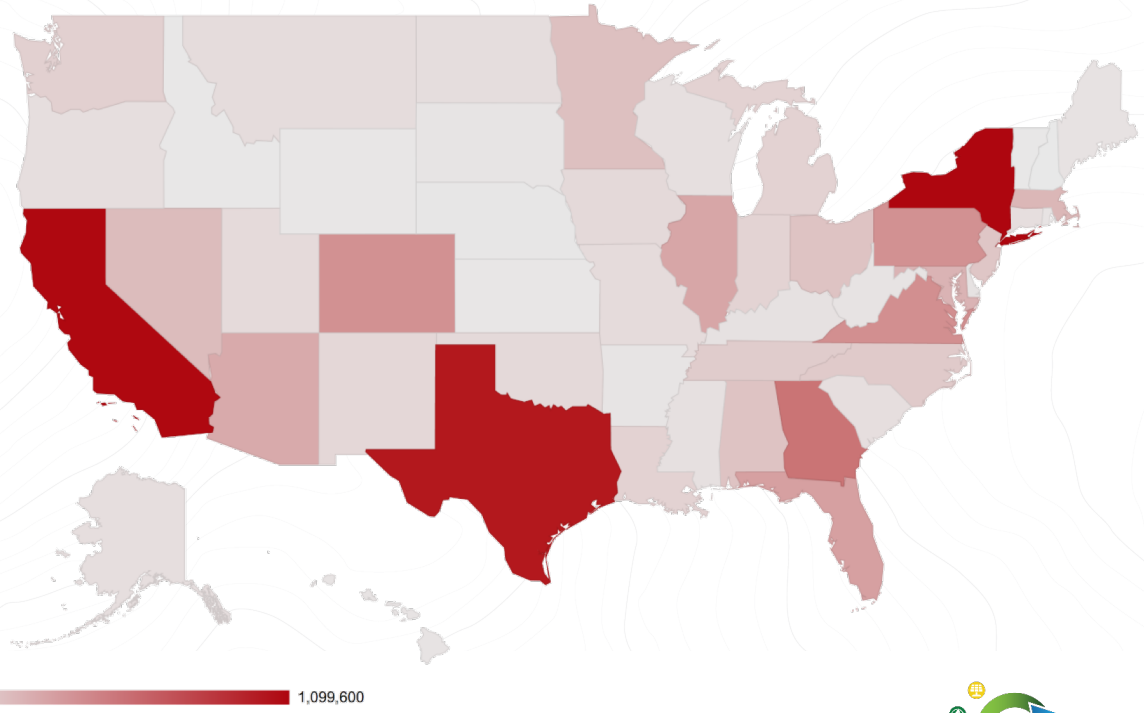



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Decision-Making: Improving Data Quality

**FY 2018 Federal Fleet Invalid Fuel Volume**

| State | Volume (GGE's) |
|---|---|
| New York | 1,099,600 |
| California | 1,088,800 |
| Texas | 1,001,238 |
| Georgia | 551,709 |
| Virginia | 425,472 |

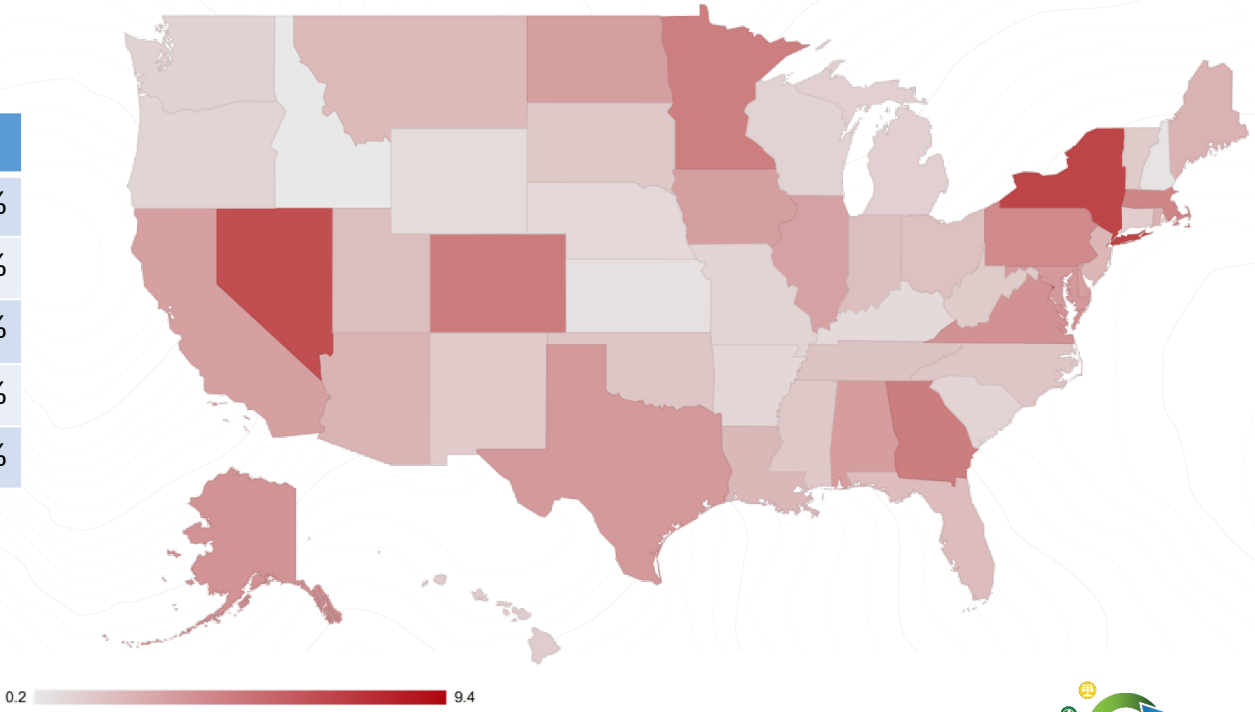



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Decision-Making: Improving Data Quality

**FY 2018 Federal Fleet % Invalid Fuel Volume**

| State | % Invalid |
|---|---|
| Dist. of Columbia | 9.4 % |
| New York | 6.7 % |
| Nevada | 6.4 % |
| Colorado | 4.5 % |
| Georgia | 4.5 % |

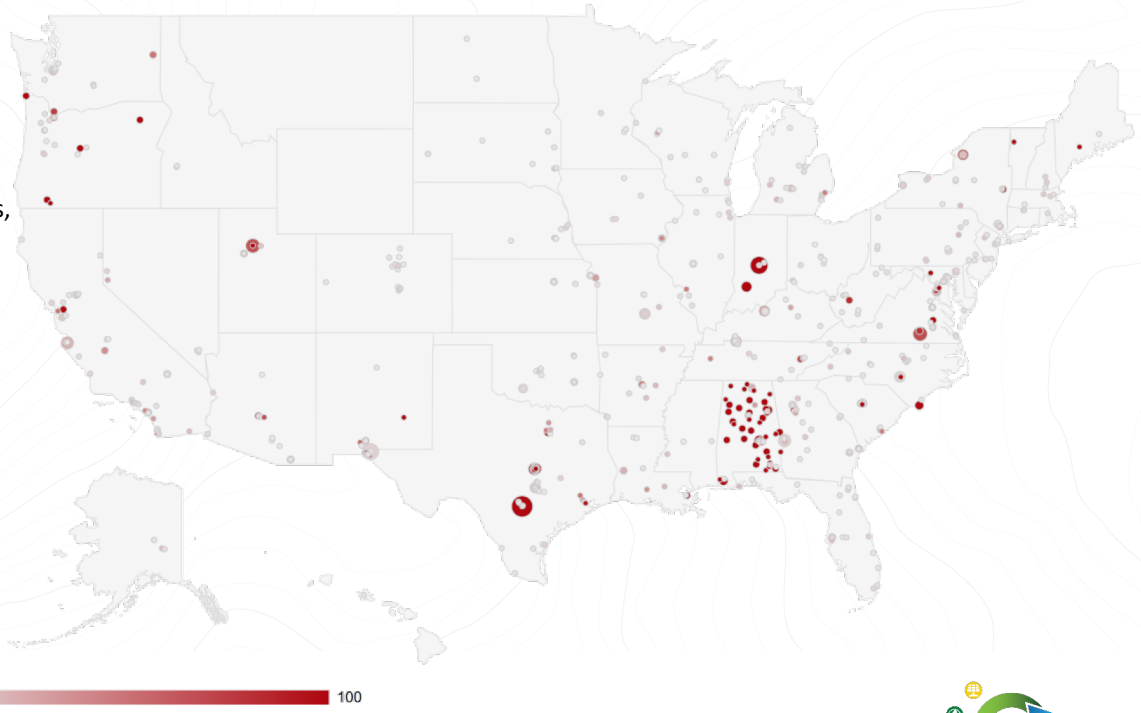



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Decision-Making: Improving Data Quality

**FY 2018 Individual Agency Invalid Fuel Consumption by Vehicle**

- Looking at an individual agency's vehicles shows two types of problems:
  - Specific locations with large volumes (e.g., Texas, Indiana, Utah)
  - Groups of vehicles with high percentages (e.g., Alabama)
- This type of view helps agency better understand how to approach problem




Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

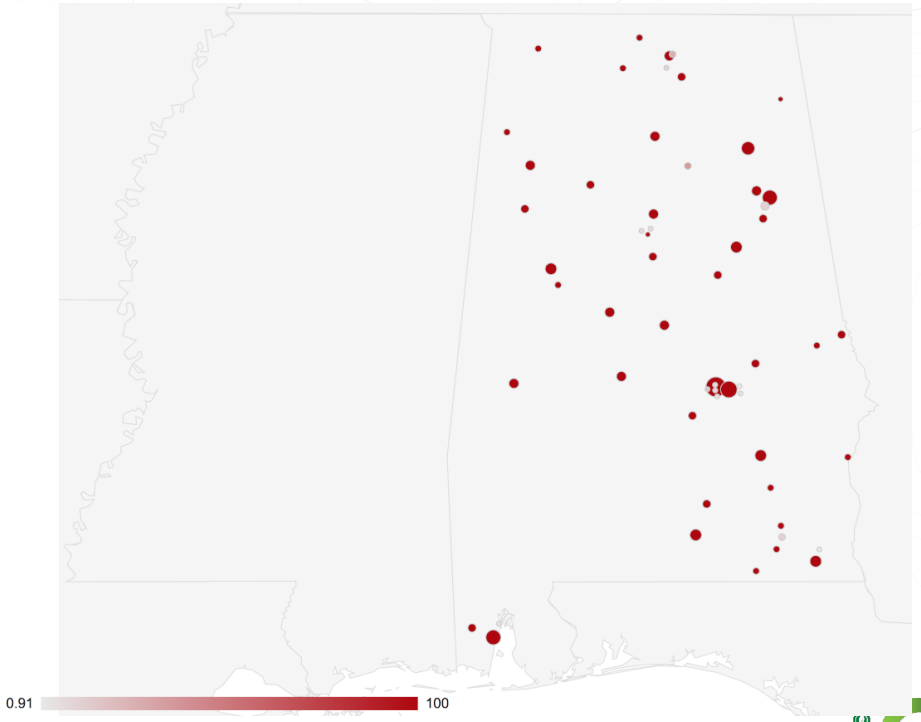
# Decision-Making: Improving Data Quality

**FY 2018 Individual Agency Invalid Fuel Consumption by Vehicle: Alabama**

- Uniformly poor across state: any vehicle with invalid fuel consumption has all (or nearly all) invalid consumption

These types of views are easily customized to help explore:

- Filter by ownership
- Filter by fuel type or vehicle fuel type
- … or any other attribute of relevance




Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Decision-Making: Looking Across Agencies

- ***Hypothetical* Question:** Are there locations where agencies could share vehicles?
  - *… and if so, where? What types? How many? Who?*
- Per-vehicle fleet data make answering questions like this feasible
- **Answer:** Maybe, let's look…

# Decision-Making: Looking Across Agencies

- Criteria for identifying potential locations for sharing:
  - Co-location: vehicles based in same ZIP code
  - Low utilization: vehicles with < 3,000 annual miles
  - Similar vehicles: same vehicle type (e.g., LD Minivan 4x2 Passenger)
  - Grouping: 10 or more vehicles from 3 or more agencies
  - Other considerations:
    - Only look at light-duty vehicle types for initial analysis
    - Only look at vehicles already in a “pool” situation (not assigned to individuals)
    - Exclude vehicles likely to be mission-specific (LE, ER, armored)
    - Exclude USPS and DOD

# Decision-Making: Looking Across Agencies

- **Answer:** 39 potential locations and vehicle types
  - If we look for locations with 2 or more agencies, it expands to 86 location+types
- Of particular interest: locations with multiple vehicle types all meeting these criteria
  - Likely more feasible based on scale and flexibility

# Decision-Making: Looking Across Agencies

- Potential locations might depend on priorities:
  - Broader group of vehicle types
  - Larger groups of agencies and/or vehicles

| Location | Vehicle Types | # Agencies | # Vehicles |
|---|---|---|---|
| Washington, DC 20024 | LD Minivan 4x2 (Passenger)<br>LD SUV 4x2<br>LD SUV 4x4<br>Sedan/St Wgn Subcompact | 5<br>4<br>7<br>3 | 14<br>10<br>17<br>16 |
| Washington, DC 20001 | LD Minivan 4x2 (Passenger)<br>LD SUV 4x4<br>Sedan/St Wgn Compact | 9<br>4<br>5 | 19<br>15<br>30 |
| Los Alamos, NM 87544 | LD SUV 4x4 | 3 | 118 |

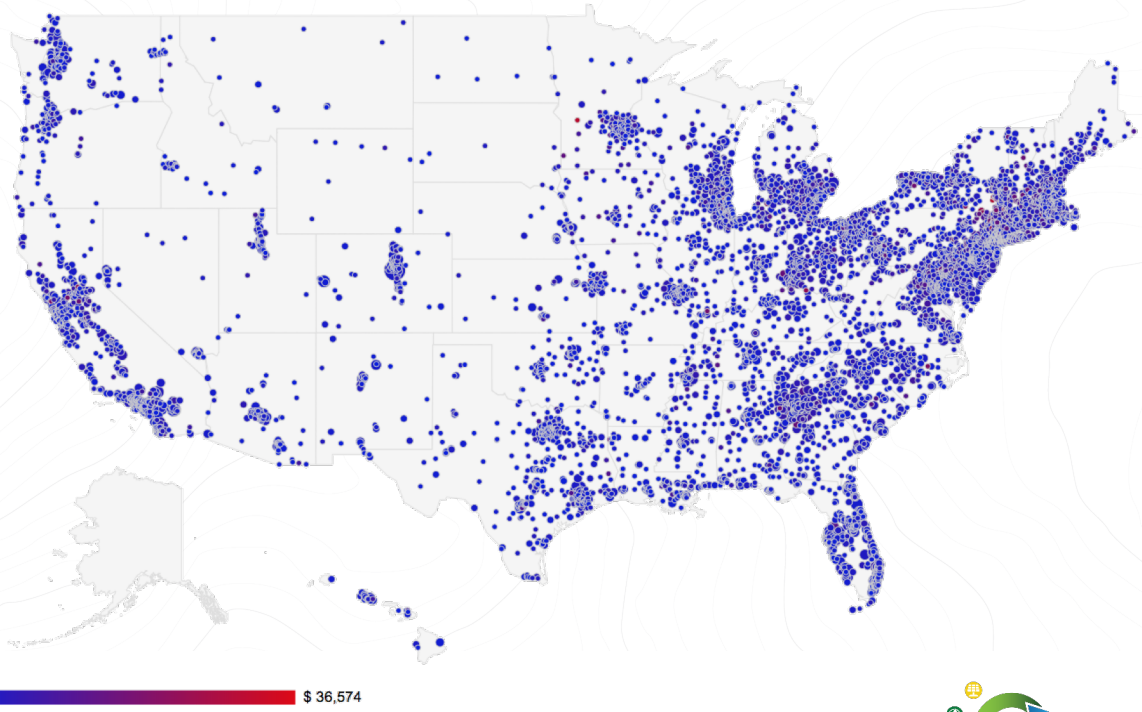
# Decision-Making: Fleet Analysis

- ***Hypothetical*** fleet analysis: Pilot project to replace USPS LLV fleet
  - 160K+ vehicles of same type and age
  - Expensive to operate and maintain
  - Can we find locations with large groups of the more expensive vehicles in this set that would serve as pilot locations for a wholesale replacement?
    - Locations with groups of vehicles may have advantages based on infrastructure or personnel

# Decision-Making: Fleet Analysis

**Vehicle Location and Operating Cost**

- Top quartile of fleet segment: annual operating cost > $8,750
- Where are they?
  - Dot size: larger = more vehicles
  - Color: Red = higher cost
- Map shows these vehicles are *widely* distributed
  - … we need a more refined view

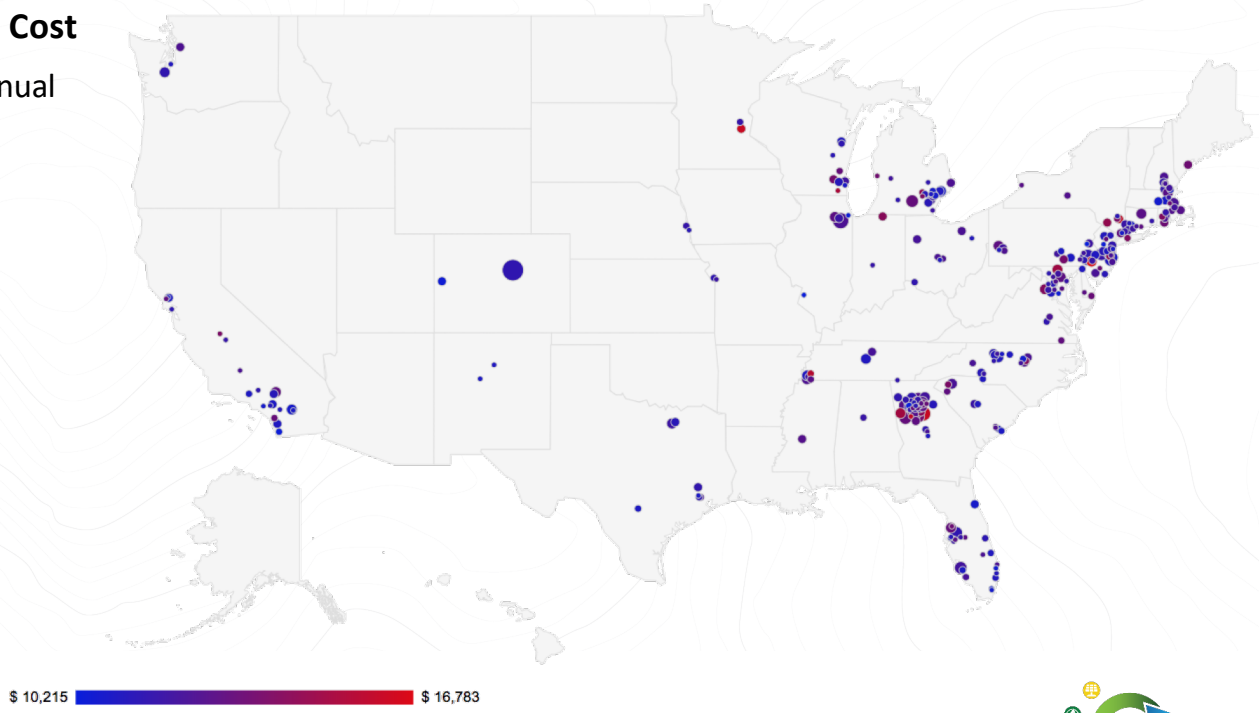



Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Decision-Making: Fleet Analysis

**Vehicle Location and Operating Cost**

- Top quartile of fleet segment: annual operating cost > $8,750
- Locations with 20+ vehicles
- Where are they?
  - Dot size: larger = more vehicles
  - Color: Red = higher cost
- Several potential locations
  - Southern California
  - Atlanta, GA area
  - NW Washington
  - Chicago/Wisconsin/Michigan areas
  - Several New England areas




Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

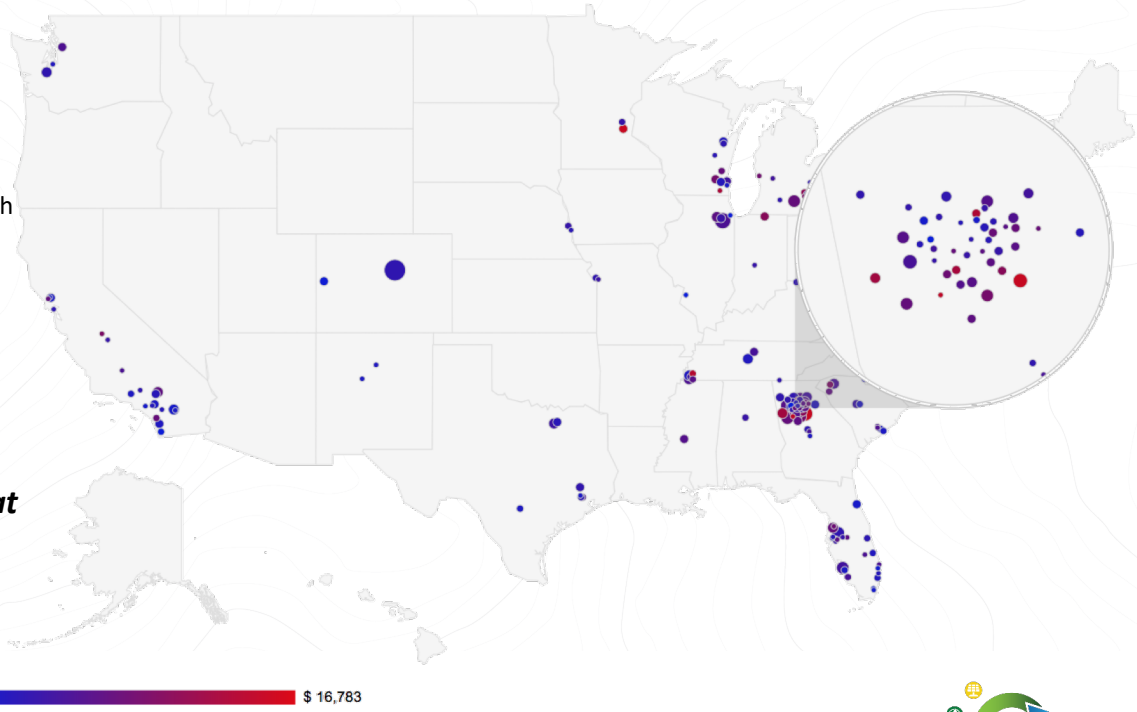
# Decision-Making: Fleet Analysis

**Vehicle Location and Operating Cost**

- Cluster of vehicle locations around Atlanta, GA
  - Covington, GA: 57 vehicles @ $16,036
  - 7 add'l locations with 40+ high cost vehicles each
  - More than 1,400 high cost vehicles in this area, all in locations with 20+ high cost vehicles

**Combination of detailed vehicle data**
**+ vehicle location data**
**+ a different way of visualizing data**

***… combine to support a type of analysis that was not feasible before.***




Source: Federal Automotive Statistical Tool (https://fastweb.inl.gov/)

# Discussion

Questions? Ideas?

Let's talk!

# FAST Program Contact Information

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